National Institute of Environmental Health Sciences

Ecological links between water storage behaviors and Aedes aegypti production: Implications for dengue vector control in variable climates

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Abstract:

Understanding linkages between household behavior and Aedes aegypti (L.) larval ecology is essential for community-based dengue mitigation. Here we associate water storage behaviors with the rate of A. aegypti pupal production in three dengue-endemic Colombian cities with different mean temperatures. Qualitative, semi-structured interviews and pupal counts were conducted over a 7-15-day period in 235 households containing a water storage vessel infested with larvae. Emptying vessels more often than every 7 days strongly reduced pupal production in all three cities. Emptying every 7-15 days reduced production by a similar magnitude as emptying 90% of households regularly used stored water for washing clothes, generating a weaker correlation between emptying and usage. Emptying was less frequent in the households surveyed in the dry season in all three cities. These results show that A. aegypti production and human behaviors are coupled in a temperature-dependent manner. In addition to biological effects on aquatic stages, climate change may impact A. aegypti production through human behavioral adaptations. Vector control programs should account for geographic variation in temperature and water usage behaviors in designing targeted interventions.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Central/South America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Dengue

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content